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Experimental Study in Fifth Grade to Explain Reasons for Children's Choice of Arithmetic as Their Favorite Subject

Submitted by
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(B.S.E., Fitchburg State Teachers' College, June, 1943)

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of Master of Education

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Acknowledgements

I wish to express my appreciation to Dr. Donald D. Durrell for his helpful guidance and cooperation in planning this study--also to the many teachers and school officials who so kindly made it possible for me to obtain the information necessary for use in carrying out the study.

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CHAPTER I

Chapter I

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I. The Problem

Statement of the problem. It was the purpose of this study to determine, as nearly as possible, the reasons for an apparent great amount of interest in Arithmetic in twenty fifth grade classrooms. In these classrooms, Arithmetic drew more votes as the favorite, than did any other subject studied by these children.

Importance of the study. There is quite an amount of writing by good authority on the psychology of interest and its effect on attention and effort. As an example, Pyle[1] maintains

[1] W. H. Pyle, The Psychology of the Common Branches, (Baltimore: Warwick and York, Inc., 1930) p.269.

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1. W. H. Pyle, *The Psychology of the Common Branches*, (Baltimore: Warwick and York, Inc., 1930) p.283.

that, "Teachers should be familiar with the psychology of interest and attention. In general we attend to and are interested in activities that give us pleasure and do not attend to and are not interested in what does not bring pleasure."

As Pyle states, this is a general principle as regards interest, while the reasons which this study attempts to prove are specific ones regarding interest in Arithmetic. It appears that, to date, there are few studies which have been made in this area. In fact, as recently as 1929, Buswell,[2] in a survey of research, indicated that there were only approximately five hundred studies in print, which could be considered quantitative and scientific, on the whole topic of Arithmetic. As a consequence, there is little present concrete evidence on the more specific topic of interest in Arithmetic.

For this reason, any information of a definite nature, or any well-substantiated experimental evidence concerning reasons for the child's interest in Arithmetic should be of some value.

Review of recent trends in the modern Arithmetic program. In defining interest, Dewey explains:

> Interest is not some one thing; it is a name for the fact that a course of action, an occupation, or pursuit absorbs the powers of an individual in a thoroughgoing way. But an activity cannot go on in a void. It requires material, subject-matter, conditions upon which to operate. On the other hand, it requires certain tendencies, habits, powers on the part of the

2 G. T. Buswell, "A Critical Survey of Previous Research in Arithmetic," Twenty-Ninth Yearbook of the National Society for the Study of Education, Part II (Bloomington, Illinois: Public School Publishing Company, 1930) p.470.

> self. Wherever there is genuine interest, there is an identification of these two things.[3]

As regards his theory for obtaining interest, and further clarifying the entire topic, Dewey states:

> ... Interest is obtained not by thinking about it and consciously aiming at it, but by considering and aiming at the conditions that lie back of it, and compel it. If we can discover a child's urgent needs and powers, and if we can supply an environment of materials, appliances, and resources--physical, social, and intellectual--to direct their adequate operation, we shall not have to think about interest. It will take care of itself.[4]

Having considered the general topic of interest, it might be well to proceed next to the importance which arithmetic assumes in the school program of today. Doubtless World War II did a great deal toward calling the attention of educators and teachers, as well as the layman, to the fact that, somewhere in the arithmetic program, there must have existed a basic deficiency of some sort. W. D. Reeve[5] has commented on the situation in an interesting fashion. "Too much time," maintains Reeve, "has been spent on computational arithmetic, and often of a very low order at that, insofar as the real needs of society are concerned. This situation should be remedied immediately."

The reason stated above for the growing concern regarding the current arithmetic program and its method of

3 John Dewey, Interest and Effort in Education, (Boston: Houghton Mifflin Co., 1913) p.65.

4 Ibid., pp. 95, 96.

5 W. D. Reeve, "Modern Trends in Mathematics Education," School Science and Mathematics, 48:30 Jan., 1948.

accomplishment, is only one reason, where many must exist. The important fact to consider, however, is that arithmetic is getting more attention as time goes on. Writers on the subject discuss the modern program in contrast with the traditional program. The main differences are (1) content and objectives of the program, (2) kind of learning process used, and (3) materials and methods of instruction.

All this leads up to the topic of "meaningful" arithmetic. This term, together with the term, "functional" arithmetic, would indicate the general trend of thought as regards recent writing on the modern program. This would seem to be a very properly defined categorical implication, as the ideas underlying these terms are later enlarged upon.

To quote Brownell:

> ... the theory of meaningful arithmetic agrees completely with prevailing educational theory in general. Both want children, as children, and later as adults, to live more efficiently, more intelligently, more richly, and more happily in their culture. That culture is highly quantitative and is steadily becoming more so. More and more vital, therefore, is the need for quantitative intelligence; hence, more and more imperative is it that we teach arithmetical meanings.[6]

McGeoch[7] points out the value of meaningful arithmetic by saying, "The conclusion that there is a high positive correlation between meaningfulness of material and rate of learning holds under a very wide range of conditions."

[6] William A. Brownell, "The Place of Meaning in the Teaching of Arithmetic," Elementary School Journal, 47:265 Jan., 1947.

[7] John A. McGeoch, The Psychology of Human Learning, (New York: Longmans, Green & Co., 1942) p.167.

In their interpretation of how arithmetic should be made meaningful, Brueckner and Grossnickle[8] have covered a variety of pertinent topics on the subject in a fashion both interesting and instructive. They discuss objectives, contributions, curriculum, principles of teaching, children's difficulties, evaluation of learning and instructional supplies and materials. Their contribution is a very practical explanation of the "meaningful" theory.

Since the term "functional" arithmetic has been used in close coordination with "meaningful" arithmetic, some mention should be made of the interpretation of this term. In part, McSwain describes it:

> Arithmetic is more than a system of number symbols and mechanical operations. Functionally, it is a language for interpreting and communicating ideas of quantity and of relationships of quantities. In a society of expanding industrial and commercial endeavors, the language of quantitative thought is indispensable. Adequacy in daily living requires an understanding of the psychological nature of arithmetic and its application in intelligent living. The functional value of applied arithmetic can be appraised only by each individual as he recognizes its usefulness to him.[9]

Going back to the principles which are being emphasized in the modern program, the first one mentioned concerned the content and objectives of the program. In discussing the theories of meaningful and functional arithmetic, these

[8] Leo J. Brueckner and Foster E. Grossnickle, How to Make Arithmetic Meaningful, (Philadelphia: The John C. Winston Co., 1947) 513 pp.

[9] E. T. McSwain, "A Functional Program in Arithmetic," Elementary School Journal, 47:380 Mar., 1947.

qualifications, particularly the objectives, have been called to the attention. As to content, the more recent trend is to eliminate those arithmetical abilities which call for mental drudgery and which are of little practical value in later years. With respect to this, West, Greene and Brownell[10] have considered the topic of elimination of material in a discussion of the arithmetic curriculum. There has also been a tendency in the past few years to make the grade placement of topics on a more slowly ascending scale of difficulty. This may be easily judged by examining almost any one of the recently written, or revised, arithmetic textbooks, in comparison with a similar textbook published several years ago. To bear this out Brownell[11] states, "The teacher, curriculum maker, or textbook writer who knows arithmetic only as it was taught in the first three decades of the century is in no position to practice or to expound the subject in its meaningful aspects." The conclusion to be drawn, then, is that there is a recent tendency toward making the arithmetic program better adapted to the child's needs and abilities. It must naturally follow that his interest in the subject is being considered, and possibly increased, thereby.

The second principle which stands out is the kind of

10 R. L. West, Charles E. Greene, and W. A. Brownell, "The Arithmetic Curriculum," Twenty-Ninth Yearbook of the National Society for the Study of Education, Part I, (Bloomington, Illinois: Public School Publishing Co., 1930) pp. 78-82.

11 William A. Brownell, "When is Arithmetic Meaningful?," Journal of Educational Research, 38:482 March, 1945.

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learning process which is being used. More and more the fact is being recognized that the child learns far more readily, and probably retains longer, that information which has been presented to him in a pleasing fashion and which has somehow been correlated as closely as possible with his own interests. This pertains to arithmetic as well as to any of the various other subjects, although arithmetic has perhaps been one of the worst stumbling blocks for children in that it has been taught so frequently in the past, largely as a subject of drill and memorization, and has seemed to have so little connection with anything which was practical to the child. In a discussion of several theories on the learning and teaching of arithmetic, Brownell[12] concludes, "The basic tenet in the proposed instructional reorganization is to make arithmetic less a challenge to the pupil's memory and more a challenge to his intelligence." Hildreth,[13] on tendencies in learning, emphasizes the need for making of integrations and relationships in the process of meaningful learning. Thus there seems to be a strong tendency arising to adapt the learning process so that it may help to further the case for meaningful arithmetic.

[12] William A. Brownell, "Psychological Considerations in the Learning and Teaching of Arithmetic," Tenth Yearbook of the National Council of Teachers of Mathematics, (New York City: Teachers College, Columbia University, Bureau of Publications, 1935) p.31.

[13] Gertrude Hildreth, Learning the Three R's, (Philadelphia: Educational Publishers, Inc., 1936) pp. 27-71.

The third principle emphasized in the modern arithmetic program is that of materials and methods of instruction. Actually, this topic is very closely allied with the one just discussed. There is a definite trend toward adapting the instruction to the individual and his needs. Providing concrete materials with which to work is becoming a common idea, thus contributing to the arithmetic a definite meaning and significance which could not otherwise be present. It is considered a good practice to draw the material for instruction, in so far as possible, from the daily activities of the child in his home and community. This, of course, provides situations which are both useful and meaningful. This method tends to create a wealth of material which is concrete and within the range of experiences of the child. Brueckner and Grossnickle[14] have written on materials of instruction in a very practical fashion.

These points which have been covered, in brief, serve to indicate what the current thought is today concerning a modern arithmetic program, which, it is believed, will more satisfactorily supplant the old traditional program.

[14] Brueckner and Grossnickle, op.cit., pp. 474-501.

CHAPTER II

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Review of Literature and Research on the Topic of Interest

Since little research has been done on the reasons for the child's interest in arithmetic, there is little proven ground on which to stand. There seems to be some consensus of opinion concerning reasons for a child's interest in arithmetic among workers in the field of elementary education, and a few studies have been made on this topic which are indicative, at least.

In discussing learning tendencies, Hildreth maintains, regarding interest:

> Some things are more interesting to children than others. The more interesting activities are those that lie within learning range, involve physical activity, involve group activity, make less demand on mental effort, are pleasant to do, are meaningful, are of significance to the child, yield some tangible and not too remote reward, are associated with something interesting if not interesting in itself, are not tedious, are not monotonous, and do not overstrain attention nor physical powers.[1]

Cole[2] writes that arithmetic is either liked, or disliked, very much by the individual child. The three reasons she gives for an extreme liking for the subject are (1) because it is obviously useful, (2) because it provides an interesting puzzle to solve, (3) because of its objectivity--the child can see just what he has to do, knows when it is done, and just how much he has done correctly. In summarizing, Cole states:

[1] Hildreth, op.cit., p.—Chap.I

[2] Luella Cole, The Elementary School Subjects, (New York: Rinehart and Company, Inc., 1946) p.394.

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2 Amelia Cole, The Elementary School Subjects, (New York: Rinehart and Company, Inc., 1946) p.[illegible].

> Probably the surest way to arouse interest in arithmetic is to have children bring problems to school and then to base the drill upon the processes and number facts needed for the solution. To be sure, the teacher has to do some adapting and changing or the children would not get enough practice on some of the combinations, but the connection with childish experiences should be preserved. The second-best way for arousing interest is to group problems around activities in which the pupils are already interested.[3]

Attempts have been made to determine the interests of children in their school subjects or other life activities. From a study of this type, in which he used about 1500 boys and girls from grades one through six, Boynton concludes:

> It appears that this study forces one to the conclusion that children's wishes, or fundamental interests cannot be explained satisfactorily in terms of group causes or affiliations....In truth, it would seem that the child's wishes must go back to the particular experiences through which he as an individual child has passed. Manifestly, there has been much "loose talk" with respect to the development of children's interests and desires. Apparently it is time for psychologists and educators to stop imposing adult-made developmental schema upon children, and recognize that each child is a separate, distinct functioning unit, who to be understood must be studied as an individual rather than as a sample of a real or artificial social group.[4]

In another study, in which he questioned over 2000 pupils in high schools in different sections of the United States, Symonds[5] determined that high school boys and girls have about

[3] Ibid., p. 400.

[4] Paul L. Boynton, "The Wishes of Elementary School Children," Peabody Journal of Education, 13:174 Jan., 1936.

[5] Percival M. Symonds, "Comparison of Problems and Interests of Young Adolescents Living in City and Country," Journal of Educational Sociology, 10:234 Dec., 1936.

the same interests whether they live in the city or country, or in the East or West.

It is generally conceded that the subject of "interest" is important to the successful progress of the child, but just what factors go to make up interest and the manner in which it functions, persist in remaining somewhat obscure. Melbo[6] has made several tentative statements on the dynamic principles of interest in concluding a survey of the literature. This particular statement would seem to have a very definite bearing on the subject as it pertains to school work. He says, "Interests tend to develop from successful adjustments: i.e., we tend to be interested because we succeed rather than succeed because we are interested."

The manner in which the curriculum content is graded and adapted to the particular background and abilities of the child appears to be of importance in his interest in a given subject. Meredith[7] writes, "If one recognizes the importance of pupil purposing in effective functional learning, one must recognize also the necessity for utilizing pupil interests in curriculum making, for pupil purposing cannot exist without sustained pupil interest...." Later Meredith says:

[6] Irving R. Melbo, "A Review of the Literature on Children's Interests," Twelfth Yearbook of the California Elementary School Principals' Association, (Sacramento: News Publishing Co., 1940) p. 19.

[7] George H. Meredith, "Utilizing Pupil Interest in Curriculum Making," California Journal of Elementary Education, 6:10 Aug., 1937.

> The fallacy of basing the school program upon passing whims of a few of the more expressive children has been frequently demonstrated. The teacher in informal teaching must still guide the educative process. Yet, the content and method must be interesting, pupils must set their own goals, and the school program must not be imposed if learning is to be functional and if desirable attitudes are to be developed.[8]

In relation to the same topic, and bearing out the increasing emphasis on pupil interests and needs in relation to the curriculum, Frederick explains that:

> Each pupil in school has a wide variety of interests and needs. The needs and interests of the various pupils in each grade and each class differ widely. Many interests, however, are common to large numbers of individuals. Some interests are fleeting, others are persistent. Many interests are highly desirable and others are undesirable. Interests and needs often coincide. In many instances, however, an individual has an actual need of which he is not aware and in which he therefore has not developed an interest. In other instances a person is interested in something which he thinks he needs but which he really does not. Interests may be modified by the environment of the individual, be that environment his neighborhood, his friends, his school surroundings, or his teachers. Interests are highly contagious.[9]

The matter of personality development in its relation to subject matter is taken up by Buswell[10] as he discusses how much freedom the child should be given in choosing his own learning experiences. He strongly indicates that the teacher

[8] Ibid., p. 12.

[9] O. I. Frederick, "Pupil Interests and Needs as a Basis for Curriculum Development," Curriculum Journal, 9:321 Nov., 1938.

[10] G. T. Buswell, "How Much Freedom Should Be Granted to Pupils to Choose Their Experiences in Learning," Elementary School Journal, 40:256-268 Dec., 1939.

is largely responsible for translating necessary learning experiences into children's interest patterns, and further, that the teacher training institutions should produce teachers who are equipped to do this.

In introducing a series of studies on children's interests in arithmetic, Culver, Robinson and Willey summarize the modern trend of thought on curriculum very nicely as follows:

> The problem of the modern curriculum maker and teacher is, then, to plan an arithmetic program which will keep pace with the child's developing interest and needs for number, and to so arrange the program that it is a series of meaningful experiences satisfying the child's inner demand for ever better social adjustment. The curriculum organizer must know what are the child's arithmetical interests and needs that he may bring the materials to be taught into closest possible relation with these interests and needs. Children's interests need to be accepted as one of the major guides in effective teaching....[11]

It is interesting to note that the suggestion offered is to endeavor to relate interests and needs to curricular material which is deemed necessary for the child, rather than adjusting the material to the interests. This should eliminate the suggestion, sometimes brought forward, of "soft pedagogy." Once again it seems that the burden falls upon the teacher's ingenuity to make interesting that which must be learned.

In a survey of children's preferences concerning the subjects included in the curriculum, covering an area of grades one through nine, Blaisden and Burkhard have drawn the

[11] Mary M. Culver, Clark N. Robinson, and Roy D. Willey, "Children's Interests in Arithmetic," Twelfth Yearbook of the California Elementary School Principals' Association, (Sacramento: News Publishing Co., 1940) p.51.

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following conclusions:

1. It is clear that children have very definite likes and dislikes so far as school subjects are concerned.

2. While there is no subject which is not liked by some children, certain subjects show a very large increment of favorable or unfavorable attitude.

3. The reasons given by pupils for disliking subjects furnish valuable clues to curriculum committees as to point of attack in revising curricula.

4. It was observable that there were sharp differences in results from school to school and teacher to teacher. This would indicate the wisdom of careful study of the methods used by the most successful teachers and schools in interesting children in given fields and seeking to spread these procedures to other teachers and schools.

5. Certain subjects were rather consistently appreciated or liked by large numbers of children, whereas certain other subjects were rather constantly disliked or not highly appreciated.

6. If a large percent of children dislike a given subject, it implies a clear obligation to study the curriculum for the purpose of changing the content, the method of teaching or the materials used.[12]

In a more specific comment concerning a preference for arithmetic, the authors state:

> The trends in children's preferences are rather striking. Some subjects remain at about the same level of preference through all the grades, while in some instances there are very definite trends.... ...In grade one, arithmetic holds sixth place. In grade two it climbs to fifth place which it continues to hold through grade three. In grade four, arithmetic jumps to second place, holding this position through the fifth grade. In the sixth grade arithmetic climbs to the top.[13]

[12] Leo B. Baisden and William J. Burkhard, "Children's Preferences in School Subjects and the Curriculum," Twelfth Yearbook of the California Elementary School Principals' Association, (Sacramento: News Publishing Co., 1940) p. 47.

[13] Ibid., p. 42.

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13 Ibid., p. 48.

In a study of the interests of 188 fifth and sixth grade boys and girls Sands[14] indicates that the tendencies in pupil preference at this level show that the children are much interested in using their hands for physically creative work. Physical activity, involving any kind of travel or movement, appeals to them. They also enjoy the dramatic, either actively or vicariously.

A study of interest in arithmetic, made by Culver,[15] indicates that time, measurement, money, and counting rate high among the children's preferences. An important factor noted in this study is that the children's interests were centered chiefly on things connected with their own immediate wants and activities.

In a classification of situations where problems involving number arose in the children's out-of-school life, Robinson[16] has reported that, in this particular study, problems related to buying comprise from one fifth to one third of the cases enumerated. Number needs of the children relating to

14 Lester B. Sands, "Interests of Pupils in an Elementary School," Twelfth Yearbook of the California Elementary Principals' Association, (Sacramento: News Publishing Co., 1940) p.28

15 Mary M. Culver, "A Study of Children's Interest in Arithmetic," Twelfth Yearbook of the California Elementary Principals' Association, (Sacramento: News Publishing Co., 1940) pp. 61-63.

16 Clark N. Robinson, "Children's Arithmetic Needs Arising in the Home Environment," Twelfth Yearbook of the California Elementary Principals' Association, (Sacramento: News Publishing Co., 1940) pp. 58, 59.

"Time" also seemed of significance, particularly in the lower grades.

In another study, in which data was gathered by seventy-seven classroom teachers in grades one through six, Willey[17] lists some social situations which lead the pupil naturally to experiences in number. According to the interest-groupings used by Willey, the two items which included the largest number of problems to be solved were (1) measuring, construction and drawing of different kinds, and (2) situations centered around the various school subjects.

In writing concerning the recognition of children's interests in arithmetic the following comment is made. "Among the skill subjects," says Shearer,[18] "none has violated the principles of pupil interest and pupil purpose to a greater degree than has arithmetic....as educators we have been slower to sense children's interests in arithmetic than we have been in any of the other so-called 'basic subjects.'" Shearer[19] continues with citing practical illustrations of functional and social arithmetic adapted to the interests of the children.

In his review on the literature of interests, Melbo has

17 Roy DeVerl Willey, "Social Situations Which Lead the Elementary School Pupil to Natural Arithmetical Experiences," Twelfth Yearbook of the California Elementary Principals' Association, (Sacramento: News Publishing Co., 1940) p.75.

18 Elga M. Shearer, "Recognizing Children's Interests in Arithmetic," Twelfth Yearbook of the California Elementary Principals' Association, (Sacramento: News Publishing Co., 1940) p.82.

19 Ibid., pp. 84-88

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[19] Ibid., pp. 84-88

written:

> On the whole, the numerous studies which attempted to locate pupil interests in terms of subject preferences seemed to be singularly unproductive of findings to which any significance can be attached. There was but little agreement in the likes and dislikes listed, and the reasons for such preferences were often expressed ambiguously in terms of interest or lack of interest of the subject matter.[20]

The statement made above is, unfortunately, all too true. As has been previously stated, the studies pertaining to reasons for the child's interest in arithmetic are few. Many of them, furthermore, have been done on comparatively small numbers of children and in limited areas. It is quite commonly acknowledged that the findings are purely preliminary and indicative rather than well proven and definite. The chief importance of the studies is that they <u>are being made</u>--that finally it is being recognized that the concept of children's interests in the teaching-learning process of arithmetic is important, and that there is a great deal more to be learned about it.

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CHAPTER III

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Manner and Materials of Procedure

Plan and scope of the study. The plan of the study originated from a questionnaire on children's interests which was administered, in 1947, to the fifth grade pupils in all the schools belonging to the New England School Development Council. In this questionnaire the pupils were asked to indicate, among other things, the school subject which they liked most. For this study it was decided to select for further observation, twenty of the above-mentioned classrooms where arithmetic was indicated as the subject liked best by a majority of the pupils in the room. Since there were many more than twenty such classrooms from which to choose, the choice was further narrowed by selecting so-called "high morale" groups, indicating that the pupils not only preferred arithmetic, but that they apparently liked, to some extent, most of the subjects which they studied--and professed, as a group, but few dislikes for any of their school subjects.

The choice of classrooms having been made, the list included fifth grade classes from seven different towns and cities in the states of Massachusetts and New Hampshire. The pupil enrollment covered was 519.

In the hope of obtaining more information concerning the interest which these children displayed in arithmetic, it was decided to visit these various classes for observation and interview. This occasioned the need for constructing some

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standard guide or technique for the recording of information obtained.

Materials used for interview and observation. The form which was finally decided upon for use in recording the data consists of a sheet for tabulating general information pertaining to the pupils and teacher, a topical observation guide, and questions with related suggestive items, for the interview. (The form used appears in the Appendix.)

A great deal of reading was done from recognized writers in an attempt to locate and evaluate the items which would be worthwhile for use in interview and observation of this type, for the purpose of determining reasons for children's interests. Literature on the psychology of the elementary school subjects, the psychology of teaching and learning, motivation and teaching of arithmetic, and other similar topics was covered, together with the literature and research on interests. Finally, on the basis of both research and opinion, the form which has been used for gathering the data was constructed.

Combining the overlapping items used for both observation and interview, there were six main topics used. These were:

1. Teaching techniques
2. Provision for individual differences
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1. Teaching techniques
2. Provision for individual differences
3. Curriculum
4. Supervisory and administrative practices

5. Pupil attitudes and participation

6. Classroom hygiene

The first three items mentioned are amply justified in the literature reviewed earlier in this study. The fourth item is one which must directly, or indirectly, have its effect on the first three. The fifth item tends to show the influence exerted on the pupil by the other factors mentioned, while the last item is one which should always be important as an indirect aid toward creating interest.

Gathering the data. Each of the twenty classrooms selected was duly visited. The arithmetic lesson, as well as some of the other school work of these fifth grades, was observed. Written record of pertinent information was made. After observing the work of the pupils, an interview was held with the teacher to obtain all possible information which did not show up in the class work observed. This information also was recorded on the form provided. In some instances it was made possible for the visitor to discuss directly with the children their reasons for choosing arithmetic as their favorite school subject.

CHAPTER IV

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Observations and Conclusions

This portion of the chapter gives the information concerning what was actually observed to be the method and procedure in the classrooms visited. The lessons observed were the regular daily work of the pupils. There is additional information included, which the teachers contributed--information concerning the topics included here for discussion which it would have been virtually impossible to obtain in the few hours alloted to each visit. General information concerning the pupils, teachers and classrooms is also covered. In some classrooms it was made possible to interview the pupils verbally concerning their reasons for a particular liking for arithmetic. Their comments are also reported.

I. Information Obtained from Observation and Interview

General information. It has previously been stated that the number of children enrolled in the classrooms which this experiment covers was 519. The number of children in the various classes ranged from 22 to 32. The number per class who chose arithmetic as their favorite subject ranges from 11 to 22, or from 50% to 83% of the class. There is quite a definite indication here that the classrooms where the teacher chose arithmetic as her favorite subject are also the ones where, in many cases, arithmetic has the highest per cent of votes as the favorite subject of the children. The class-

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rooms visited were all of heterogeneous population. Different nationalities and socio-economic backgrounds were represented. Since this factor was not controlled, no definite statement may be made or figures quoted concerning the age and intelligence of the children, but, again, enough figures were obtained to give a very definite indication of these facts. The indication is that the majority of the children fell within the 10 to 11 year old range which is normally expected of fifth grade children. Since these were heterogeneous groupings, there were the usual deviates, some older and some younger than the majority of the group. Concerning intelligence, the indication is that the averages in the twenty classrooms would all fall within the normal range but with a wide variance from class to class. As with age, there were the individual deviates falling outside the normal range, both above and below.

The twenty teachers whose classrooms were visited varied in number of years of teaching experience from 2 to 30. Some of them held diplomas from Normal Schools, while others had bachelor's degrees from Teachers' Colleges. Still others had B.A. degrees from different Universities, while only one of the twenty had a Master's degree in Education. Of the twenty, most of these teachers had taken courses in Education since their graduation from school. Some had taken many courses and others only a few. Ten of the twenty teachers rated arithmetic as their favorite subject for teaching. The apparent teaching

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ability observed was average or above, while in about half the instances it was definitely superior.

Information and related factors concerning the arithmetic lesson

A. Teaching Techniques

1. Textbook. The manner in which the textbook was used in the twenty different classrooms is indicated as follows:

Manner of use	No. of cases
No textbook	3
Textbook used almost entirely	2
Textbook used basically with much supplementary material	15

In the 17 classrooms where a textbook was used, there were six different authors in use. Most of these texts were recent or revised editions. There was a marked similarity in form and content from one book to the next. In most instances the teacher felt that a textbook used exclusively did not provide enough practice and supplementary work for the pupil. Therefore a variety of supplementary material was used in most instances.

2. Other instructional materials. The use of instructional techniques and materials is demonstrated by the information which follows.

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2. Other instructional materials. The use of instructional techniques and materials is demonstrated by the information which follows.

Instructional Technique or Material	No. of Classrooms	No. of Cases Where Item Appeared
Vocabulary Work	20	20
Concrete Objects	20	19
Instruments and Devices for Measurement	20	20
Pupil Participation in School and Community Activities	20	20
Excursions and Field Trips	20	8
Motion Pictures	20	0
Pictures and Visual Aids	20	16
Dramatizations	20	15
Exhibits	20	14
Games	20	8
Formal Drill	20	19
Unit Method	20	2

There was a very general and wide use of vocabulary work and concrete objects in the classrooms visited. The curriculum included a great deal of work on fractions, which is a new idea to the pupils in their fifth school year. It lends itself well to vocabulary work since there are many new concepts and definitions to be learned. Various methods of use for vocabulary work were demonstrated in much of the work which was observed. The teachers contributed many other ways in which the vocabulary work is used on occasion. Concrete objects were used in many of the lessons observed. These were

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used many times to give the pupils the visual idea of the whole and its parts in various fractional divisions.

Instruments and devices for measurement were also widely used. These were used more frequently as a learning aid in incidental situations involving arithmetical activity: i.e., map work, taking care of milk money, using clock, calendar, etc.

To some extent pupil participation in school and community activities occasioned the use of arithmetical computation in each classroom, but the variety of activities was not particularly extensive in most cases. Those activities which occured most frequently were (1) Keeping attendance records, (2) Keeping height-weight records, (3) Keeping records of athletic events, (4) Managing ticket sales for school events, (5) Buying refreshments for school parties, and (6) Collecting bus or carfares for trips or excursions.

Excursions and field trips were used so little as to be almost negligible in any interest-producing effect. These trips did not average as much as one per classroom and many of the classes had taken none at all.

There was not one of the classrooms in which motion pictures were used in connection with arithmetic. Other pictures and visual aids were used quite widely, including such things as graphs, charts, clippings, pictures and posters.

Although the use of dramatization appeared somewhat in most of the classrooms, it was so little used as to appear

relatively unimportant. Many of the classrooms had made some use of exhibits. These were chiefly displays of geometric designs and patterns made in the art classes with an occasional stamp or coin collection contributed by some one individual.

Little use was made of games in the lessons observed although several teachers reported the use of some game devices.

Only one teacher reported that she used no formal drill. The remainder of the twenty reported from 5 to 20 minutes per day spent on drill. The basic number facts and multiplication tables were both popular as drill material. In many of the lessons observed some drill work was used.

The unit method of teaching was reported by only two of the twenty teachers.

3. Pupil awareness of success or failure. The tendency to demonstrate the pupil's progress or lack of it, was evident throughout the classrooms. There was only one class where this was omitted. This happened to be a school system where no marks were used and pupils were not retarded. In many of the classrooms there were charts in evidence showing pupil progress in arithmetic. Other pupils kept individual progress charts. All classes with the exception of two, kept some individual progress records. Many of them also had records of comparative achievement within the group. Different types of tests were used for obtaining the information for these records. The tests most frequently used were teacher-

made, both objective and informal. In the class work observed frequently there was oral discussion of either individual or group accomplishment.

B. Provision for individual differences. There were no remedial teachers available for any of the classes visited, with the exception of one, where a helping teacher gave special help daily to a small number of pupils who were having the most difficulty with arithmetic. Any other remedial work was done in the classroom by the regular teacher. About half of the classes observed were taught as one group. In these instances the teacher had a period for individual instruction when confusions and errors were corrected. Many of these teachers indicated that the class was divided into smaller groups on occasion. The other half of the classes observed were divided into from 2 to 5 groups using differentiated assignments and receiving individual instruction and assistance from the teacher. Two of the classes were divided into several small groups, each having a group leader.

C. Curriculum. The content of the curriculum, as it was demonstrated in the lessons observed, included review work with whole numbers, some long division and a very little measurement. The main topic, which was introduced as new work to the fifth grade classes, was that of fractions.

In most instances the teacher had some share in helping to plan the curriculum, while in only a few instances did the pupils have any opportunity for helping to choose the topics

to be studied or to plan the work. The curriculum content had been compiled or revised recently in most of the schools. The time allotted to the teaching of arithmetic in class work averaged about 40 minutes per day. This was about the same amount of time which was allowed for Reading and the social studies, and somewhat more than the amount allowed for the teaching of English.

D. Supervisory and Administrative Practices. None of the twenty classrooms visited had an arithmetic supervisor. Any supervision of the classroom work was carried out by the principal. The principals acted as administrative rather than supervisory officials. Only 6 teachers reported any observation of class work or any instances where constructive criticism was offered on occasion. The indication seemed to be that, aside from a prescribed curriculum, the teacher was free to carry on her work in the manner best suited to her own ideas. Supplies and materials for carrying out the program varied in quantity and type from room to room, but only 3 teachers reported inadequate materials for carrying out the program which they had planned.

E. Pupil Attitude and Participation. In each class visited the pupils were cooperative and busy. In many instances a great deal of responsibility was assumed by the individual, and the percentage of pupils who made contributions to the lesson was generally large. In a small number of cases teachers with personalities inclined to be a bit

domineering, received participation largely on request. It is in the respect of pupil attitude and participation where a more modern trend is noted. Actually, in all the schools visited, the teaching itself was of a very traditional nature. Strangely enough, in a few of the schools which are reputed to be very progressive, the teaching methods were most strongly traditional. It is in the behavior patterns of the pupils and the provision for individual differences where most change is shown from the traditional manner. One excellent teacher expressed the viewpoint that she did not care for group work and did not advocate activities. Of the twenty classrooms visited, hers was without doubt one of the best, with the whole class appearing busy, happy, and doing a fine job of accomplishment. In many of the classes responsibility was delegated to the individual pupil in helping other classmates individually, or in acting as group leaders. The attitude of the pupils in these classes demonstrated very forcibly that the personality and teaching ability of the teacher must have a great deal of influence on the pupil's interest in the lesson, since twenty different personalities were observed and a like variety in presentation of material.

F. Classroom Hygiene. Most of the classrooms visited were as attractive and conducive to good work as the physical circumstances would permit. The teachers in general had made the most of what they had to work with. In a few cases the buildings and equipment were very old and ill-adapted to the

teaching situation, but in the worst one of these the teacher had been most ingenious in using the equipment she had at hand. In all the classrooms there were exhibits of material which had been collected pertaining to the various subjects which the pupils studied, as well as samples of work done in the different classes.

Children's comments on their reasons for choosing Arithmetic as their favorite subject. To determine just why certain children like arithmetic as well as they do is rather difficult, even after observation and experimentation with this end in view. The pupils themselves, in many cases, do not seem to have a very definite or consciously formulated idea of why they like it. It would seem that many reasons which were stated by the pupils serve to substantiate very well the reasons given by Cole.[1] A surprising number of pupils will offer the reasons "because it's easy" or "because it's interesting" and nothing further than this, until they are urged to enlarge upon these ideas.

The following reasons for liking the study of arithmetic very much were expressed by individual pupils in the classrooms which were visited.

1. "It's easy."
2. "It's interesting."
3. "It's fun."
4. "Our teacher makes everything easy."
5. "It's the subject that's most like a game."
6. "because we have a lot of contests and games."

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7. "like the way the teacher teaches it." (This comment was made in a classroom where the teaching was markedly of the traditional type.)
8. "It's like a game--it always clicks-checks."
9. "It's interesting--fun to think of answers."
10. "It's difficult--gives you practice for other difficult subjects."
11. "Yor learn something new every day."
12. "It helps us take care of milk money."
13. "It goes from easy things to harder things in steps."
14. "It's very useful for many things in later life."
15. "My Father's an income tax collector. I'd like to be like him."
16. "You need to know how to make change when you're going to the store and selling papers."
17. "You feel as though you have something to do."
18. "When you grow up you have to know how to figure your salary."
19. "I go to the store for my grandmother--don't want to be cheated."
20. "It's useful if you're working in a bank."
21. "It's useful if anyone wanted to be in the automobile business."
22. "use it for things you want to figure out."
23. "If you have a job as salesgirl you need to know how to do arithmetic."
24. "You need it for getting a job."
25. "My Father is a Math teacher."
26. "If you want a job you need to know it--likely to get fooled if you don't."
27. "use it everywhere you go."
28. "because I can do it better than any other subject."
29. "never liked it until I got to the fifth grade--then we had fractions."
30. "Our teacher teaches us by fun."
31. "You can do many different things with fractions. Subtraction is always the same."

These comments of the pupils present a variety of ideas as to why they like arithmetic. In one particular classroom it was very strongly stated that the majority of the class had never cared a great deal for the study of arithmetic until the fifth year, when the topic of fractions was introduced. Many of the children professed an active dislike for arithmetic in the previous grades. They had particularly disliked

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long division which they learned in the fourth grade.

The only explanation contributed by the teachers for the children's interest was the commonly given one, that it is very definite and specific in its requirements and results. There was one exception to this, however. One teacher, who had no connection with the class which had expressed the same opinion, voiced the belief that it was due to the curriculum content that arithmetic was the favorite subject in the fifth grade. She explained that the new fractional material which is introduced, provides a change from the fundamentals which have been the work of the lower grades, and also gives an opportunity for the practical use of those same fundamentals which have previously entailed so much drill. The teacher making this statement was an excellent teacher who had had experience in teaching some of the lower grades as well as the fifth.

Conclusions. It has been stated more than once in previous chapters that finding concise and definite reasons why certain children have a great amount of interest in arithmetic is extremely difficult. There are many possible reasons, but none of them probably well or positively proven. This study has resulted in certain definite conclusions, some of which might easily be the actual reasons why these children have chosen arithmetic as their favorite subject. There is no positive proof, however, that these are the real reasons. The writer, therefore, makes these statements in a tentative

fashion with the idea that they are preliminary views and indicative of what some of the reasons for the children's interest in arithmetic may be. The conclusions derived from the study follow.

1. It appears that the teacher has a great deal of influence on the child's interest or lack of it. Her personality and her own personal interest in the subject matter and the children themselves have great power to create or destroy interest. There is a contagion related to interest which passes from the teacher to the children where there is confidence and liking on both sides. The teacher who brings successful learning experiences to the child will usually have an interested pupil. The methods and materials used would seem subordinate to the personality factor. This, of course, may be true of subjects other than arithmetic.
2. It is strongly indicated that children's interests differ from grade to grade. This would substantiate the statement that children find fifth grade arithmetic a favorite subject because a new topic, fractions, is introduced here. This topic provides them with new and fascinating concepts with which they have not previously been familiar. It also provides for the manipulation of number facts which they have been studying in the lower grades.
3. Arithmetic textbooks and curriculum content are constantly being graded and revised to adapt themselves better

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3. Arithmetic textbooks and curriculum content are constantly being graded and revised to adapt themselves better

to the particular backgrounds and abilities of the children who use them as guides in learning.

4. Regardless of all the writing and theory concerning the modern arithmetic program, teaching methods tend toward the traditional rather than the modern. It is the indication that children still count it as the favorite subject in those classrooms where many traditional methods are used.

5. Whether the child is bright or dull seems to have little effect on his interest in arithmetic. This may be explained to some extent by the excellent manner in which individual differences are being handled, including the frequent use of group work and differentiated assignments.

6. Different children like arithmetic for different reasons. Some children like it because it's "fun" or a "game." These children like it because it's a school lesson painlessly accomplished. Other children like it because apparently they are endowed with practical minds which, thus early, perceive that some day it should be of great value and use to them. Children whose backgrounds require them to work at an early age are almost invariably interested in arithmetic. They have already found many uses for it. Still other children like it because of its extremely concrete nature. They know exactly what and how much they have to do, they know when they have it done, and they know to what extent their work is correct.

7. Many children who have chosen arithmetic as their favorite subject in fifth grade would probably not have made that choice in the lower grades and, quite possibly, would not choose it as the favorite as they progress to the higher grades.

CHAPTER V

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Suggestions for Further Study and Experiment

In the light of the information presented in the preceding chapter it would seem that there must be much more information obtained and much more experimentation performed before one can hope to make entirely conclusive statements concerning definite reasons why certain children choose arithmetic as the subject in which they are most interested. The literature on studies done in the past, as well as this experiment, yield tentative ideas, but do not definitely solve the problem which is being studied. Some of the ideas and impressions obtained in this study were, however, strongly enough indicative of certain trends to make it seem worthwhile to use them as a basis for further study and experiment. With this idea in mind the writer offers suggestions of this kind.

Suggestions for further study and experiment.

1. It would seem a good idea to include more than one grade in another experiment since there was evidence in this study that the fifth grade curriculum content is liked far better by the children than the arithmetic curriculum in several of the other grades.
2. To have the experiment extend over a much longer period of time should be productive of more information. It is suggested in the literature that children's interests fluctuate and vary from time to time. It should

Chapter V

Suggestions for Further Study and Experiment

In the light of the information presented in the preceding chapter it would seem that there must be much more information obtained and much more experimentation performed before one can hope to make entirely conclusive statements concerning definite reasons why certain children choose arithmetic as the subject in which they are most interested. The literature on studies done in the past, as well as this experiment, yield tentative ideas, but do not definitely solve the problem which is being studied. Some of the ideas and impressions obtained in this study were, however, strongly enough indicative of certain trends to make it seem worthwhile to use them as a basis for further study and experiment. With this idea in mind the writer offers suggestions of this kind.

Suggestions for further study and experiment.

1. It would seem a good idea to include more than one grade in another experiment since there was evidence in this study that the fifth grade curriculum content is liked far better by the children than the arithmetic curriculum in several of the other grades.

2. To have the experiment extend over a much longer period of time should be productive of more information. It is suggested in the literature that children's interests fluctuate and vary from time to time. It should

be interesting to experiment with the same classes in two different grades: i.e. to make the study with certain fourth grade classes, perhaps, and the following year carry out the same procedure with the same children in the fifth grade.

3. Since some of the indications for an interest in arithmetic, as obtained in this study, could also be similarly applied to other subjects, it might be well to make a comparative study using some other well-liked subject. This would probably bring out points of marked contrast if they exist.

4. The idea that different children like arithmetic for different reasons would suggest that another study might be set up to allow more time and make more provision for varied ways of obtaining children's opinions and statements both individually and in groups. It is the writer's opinion that much information might be obtained from the children themselves.

It would seem that these suggestions, if carried out, should prove to be sources of a fund of information which this study does not include.

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APPENDIX

Interest in Arithmetic

General Information

Date:

Town: Teacher:

School: Superintendent:

Class: Principal

Other supervisory officers

1. _____
2. _____
3. _____

Class Information

1. _____ No. of children
2. _____ No. of children who chose Arithmetic as favorite subject
3. _____ Same number expressed as per cent
4. _____ Average class I.Q.
5. _____ Average grade equivalent
6. _____ Average chronological age
7. _____ Percentage of attendance for the year

Teacher Information

1. _____ No. of years' experience
2. _____ Degree or diploma
3. Graduate of what school _____
4. _____ Semester hours' credit since graduation
5. _____ No. of courses in Arithmetic
6. _____ Placement of Arithmetic for interest in teaching
7. Apparent attraction for children
   Very great Moderate Little
8. Apparent teaching ability
   Very great Moderate Little

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Arithmetic Interest Survey

Observation Guide

I Teaching Techniques

1. Textbook used Other books or workbooks
2. Vocabulary work done
3. Concrete objects used
4. Instruments of measurement used
5. Games or devices used
6. Visual aids or pictorial material used
7. Exhibits in evidence
8. Any dramatization used
9. What formal drill

II Provision for Individual Differences

_____ 1. Group instruction

_____ 2. Individual instruction

_____ 3. Differentiated assignments

_____ 4. Participation in activities according to individual ability and interest

III Pupil Awareness of Success or Failure

_____ 1. Group achievement record

_____ 2. Individual achievement records

_____ 3. Oral discussion of accomplishments

_____ 4. Check test

IV Pupil Attitude and Participation

_____1. An interested and alert class

_____2. Active cooperation shown

_____3. Each child contributing to group activity

_____4. Time used to best advantage

_____5. Much individual responsibility assumed

V Classroom Hygiene

_____1. Room attractive in appearance

_____2. Suitable furnishings for efficient work

_____3. Adequate lighting

_____4. Well-regulated temperature

_____5. Good ventilation

_____6. Pleasant atmosphere

VI Any other outstanding features noted

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VI Any other outstanding features noted

Arithmetic Interest Survey

Standard Interview

I. Teaching Techniques

A. Textbook

(Answer Yes or No)

1. Is the textbook used almost entirely?_____

2. Is it used as a reference book?_____

3. Is it used basically with much supplementary material? _____

Name most frequently used supplementary texts
(1)
(2)
(3)

List other supplementary material, such as workbooks, problem sheets, etc.
(1)
(2)
(3)

B. Other instructional materials

(Check items used occasionally. Double check those used frequently.)

1. What is done to increase and broaden the vocabulary of Arithmetic?

_____ (1) Using dictionary

_____ (2) Using given words in sentences

_____ (3) Matching words with definitions, objects, or pictures

_____ (4) Supplying missing words in completion exercises

_____ (5) Naming unit of measure or instrument used in measuring

_____ (6) Writing correct words for abbreviations

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_____ (7) Naming geometric figures or drawing figures which have been verbally expressed

_____ (8) Restating arithmetical expressions in other words

_____ (9) Giving antonyms or synonyms of words

_____ (10) True-False exercises

_____ (11) Naming units and instruments of measurement used by various workers, such as grocers, carpenters, etc.

_____ (12) Writing lists of words that relate to given words, such as fraction, money, circle, time

2. What use is made of concrete objects?

_____ (1) Objects which may be cut into equal parts, such as apples, oranges, rectangular sheets of paper

_____ (2) A graduated measuring cup

_____ (3) Milk containers holding a pint or quart

_____ (4) Ticker tape, ribbon, or string which may be cut into equal parts

_____ (5) Graduated foot ruler

_____ (6) An automobile speedometer

_____ (7) Cardboard rulers graduated to tenths and hundredths of a foot

_____ (8) Squares divided into tenths or hundredths

List others which you use

_____ (7) Naming geometric figures or drawing figures which have been verbally expressed

_____ (8) Restating arithmetical expressions in other words

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_____ (8) Squares divided into tenths or hundredths

List others which you use

3. What instruments and devices for measurement are used? (Underline each instrument which you use. Add others not listed.)

(1) Quantity

adding machine, number charts, tallying devices, street numbers

(2) Length

ruler, yardstick, tape measure, micrometer, speedometer

(3) Time

calendar, clock, watch, stop watch, timetable, school clock system

(4) Value

coins, bills, checks, tokens, stamps, tickets, bonds, price lists, price tags

(5) Weight

scales, height-weight charts, pictures of scales for weighing large amounts, weight labels

(6) Area

sq. in. cards, sq. ft. cards, sizes of rugs and rooms, house plans, garden plans, maps

(7) Volume

pt., qt., gallon measures; cup, tsp., tblsp., peck and bushel measures, cubic inch blocks

(8) Temperature

thermometer, thermostat, automobile temperature gauge

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(7) Volume

pt., qt., gallon measures, cup, tsp., tblsp., peck and bushel measures, cubic inch blocks

(8) Temperature

thermometer, thermostat, automobile temperature gauge

4. What pupil participation exists in school and community activities?
(Check items used occasionally. Double check those used frequently. Add others used.)

_____ (1) Keeping attendance records

_____ (2) Keeping health and height-weight records

_____ (3) Keeping records of athletic events

_____ (4) Computing costs of school exhibits

_____ (5) Taking inventory of school supplies

_____ (6) Taking care of deposits in school savings banks

_____ (7) Managing ticket sales for school events

_____ (8) Laying out school gardens and computing cost

_____ (9) Planning expenditures for school library

_____ (10) Finding cost of school supplies

_____ (11) Estimating cost of playground apparatus

_____ (12) Conducting sales to raise funds for school

_____ (13) Buying refreshments for school party

_____ (14) Collecting bus or carfares for a trip or excursion

5. What excursions and field trips have been taken?
(Underline those taken. Name the kinds of stores, civic centers, etc.)

(1) Stores

(2) Places of business

(3) Civic departments

(4) Health centers

(5) Sport centers

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_____ (2) Keeping health and height-weight records

_____ (3) Keeping records of athletic events

_____ (4) Counting coats of school exhibits

_____ (5) Taking inventory of school supplies

_____ (6) Taking care of deposits in school savings banks

_____ (7) Managing ticket sales for school events

_____ (8) Laying out school gardens and computing cost

_____ (9) Planning expenditures for school library

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(1) Stores

(2) Places of business

(3) Civic departments

(4) Health centers

(5) Sport centers

(6) Transportation

(7) Developmental centers
(i.e., libraries, parks, museums)

6. What motion pictures and films are shown?
(List titles)

(1)
(2)
(3)

7. To what extent are other pictures and visual aids used?
(Dynamic functional textbook illustrations, or the same type of illustration derived from other sources)
(Underline those used. Add others.)

graphs, charts, maps, business forms, clippings, diagrams, pictures, pamphlets, posters

8. Are dramatizations of uses of Arithmetic used?
(Underline those used. Add others.)

(1) Real situations

a. Ordering and buying at the store
b. Making and checking change
c. Buying streetcar tokens
d. Paying library fees
e. Mailing letters

(2) Imaginative situations

a. How the Indians told time
b. Barter as a basis for trade
c. How savages count
d. Strange ways of measuring distance

9. What use is made of exhibits?
(Check once those visited. Double check those made by the class. Add others used.)

(c) Transportation

(7) Developmental centers
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_____ (1) Collections of stamps

_____ (2) Coin collections

_____ (3) Old clocks and timepieces

_____ (4) Timetables

_____ (5) Geometric designs and patterns

10. Games
(List those used)

11. Formal drill

(1) How much time is spent on drill daily? _____

(2) On what types of material is drill used?
(Check those used. Add others.)

_____ a. Number facts

_____ b. Multiplication tables

_____ c. Items derived from frequency lists of errors on daily papers and tests

_____ d. Problem processes

12. Do you use the unit method?

C. To what extent is awareness of success or failure used?
(Check correct response)

1. Is evaluation of work recorded with regard to individual's standing in his group?

Frequently _____ Seldom _____ Never _____

_____ (1) Collections of stamps

_____ (2) Coin collections

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Frequently _____ Seldom _____ Never _____

2. Is individual achievement and progress recorded?

Frequently _____ Seldom _____ Never _____

3. What method of obtaining this information is used? (Check those methods used. Add others.)

_____ (1) Charts or graphs

_____ (2) Tests

____ a. Teacher-made objective

____ b. Standardized objective tests

____ c. Informal

_____ (3) Problem-situation tests

_____ (4) Evaluating products of activities

II. What diagnostic and remedial measures do you use?

A. Diagnostic Procedure

1. Is there a remedial teacher or supervisor available? _____

2. How much time does she devote to this classroom? _____

3. What tests are used for determining specific individual weaknesses in Arithmetic? (List tests)

4. By whom are these tests administered?

B. Remedial provisions made in regular classroom work (Check those used. Add others.)

_____ 1. Varying rates of progress on time basis

_____ 2. Minimal, average, and maximal assignments

2. Is individual achievement and progress recorded?

Frequently _____ Seldom _____ Never _____

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(Check those methods used. Add others.)

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_____ 1. Varying rates of progress on time basis

_____ 2. Minimal, average, and maximal assignments

_____ 3. Groups graded according to ability--cooperative division according to interests and abilities

_____ 4. Varying degrees of efficiency required for same assignment, with marks based on this principle

III. Curriculum

A. Planning

1. Does teacher have share in planning?_____

2. Do pupils assist in planning work? _____

3. When was curriculum last revised? _____

B. Time Allotment

1. How much time is given daily to Arithmetic? _____

2. How does this compare with time alloted to other studies?

Reading _____

English _____

Social Studies _____

3. What percentage of time in Arithmetic is given to written work? _____

to oral work? _____

IV. Supervisory and Administrative Practices

A. Does supervisor aid in planning program or method of execution? _____

_____ 3. Groups graded according to ability--
cooperative division according to
interests and abilities

_____ 4. Varying degrees of efficiency required
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IV. Supervisory and Administrative Practices

A. Does supervisor aid in planning program or
method of execution? _____

B. How frequently is teacher actively supervised?
_____

C. Does teacher receive constructive criticism from supervisory officer? _____

D. Is teacher given time for observation of other teachers? _____

E. Are supplies adequate to carry out Arithmetic activities as planned? _____

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_____

5. Does teacher receive constructive criticism from supervisory officer?

_____

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_____

7. Are supplies adequate to carry out Arithmetic activities as planned?

_____

Phelps, H.D.
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